



CELEBRATING **50**
YEARS
in 2010

*Engineering Earth's Development
Preserving Earth's Integrity*

Ground Water in the Piedmont and Blue Ridge

Jim Renner





Acknowledgements

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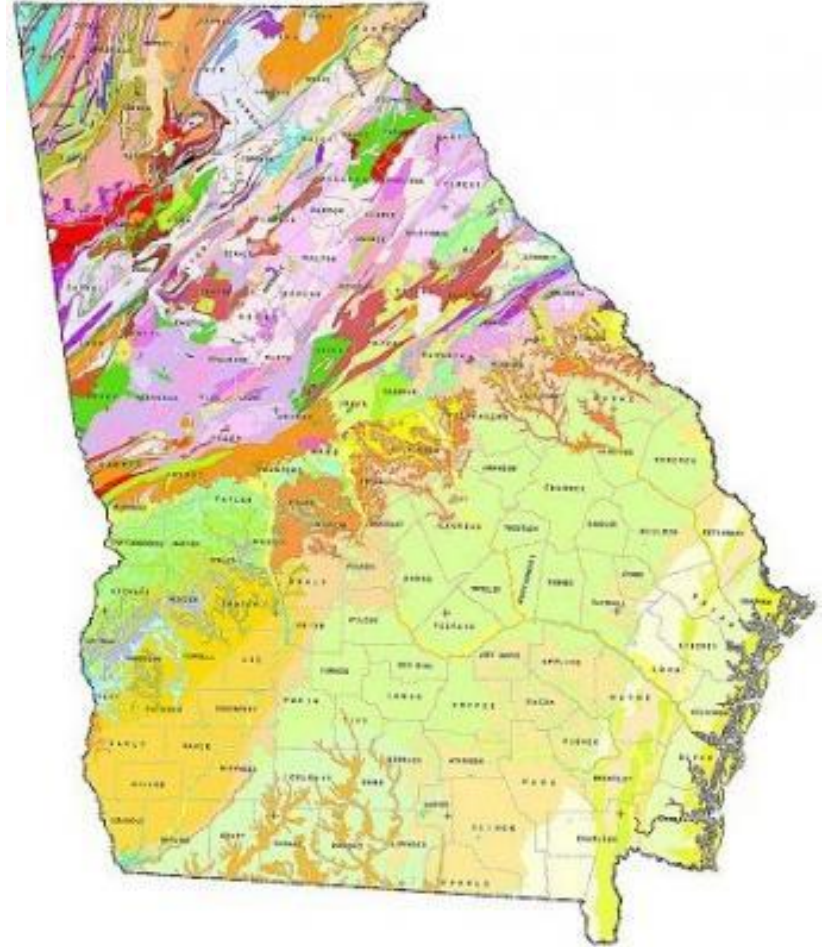
Ground Water in Piedmont & Blue Ridge

- Where is it?
- How do I find it?
- How much is there?
- Is it a viable supply for north Georgia municipalities?





Piedmont and Blue Ridge Provinces





Where is it?

Ground water occurrence and production in igneous and metamorphic rocks influenced by:

- **Rock type**
- **Structure** - Discontinuities due to compositional differences and fractures (joints and/or faults)
- Depth of **weathering**
- **Topography**
- **Recharge** area
- Spatial **relation** of all factors





Where is it?



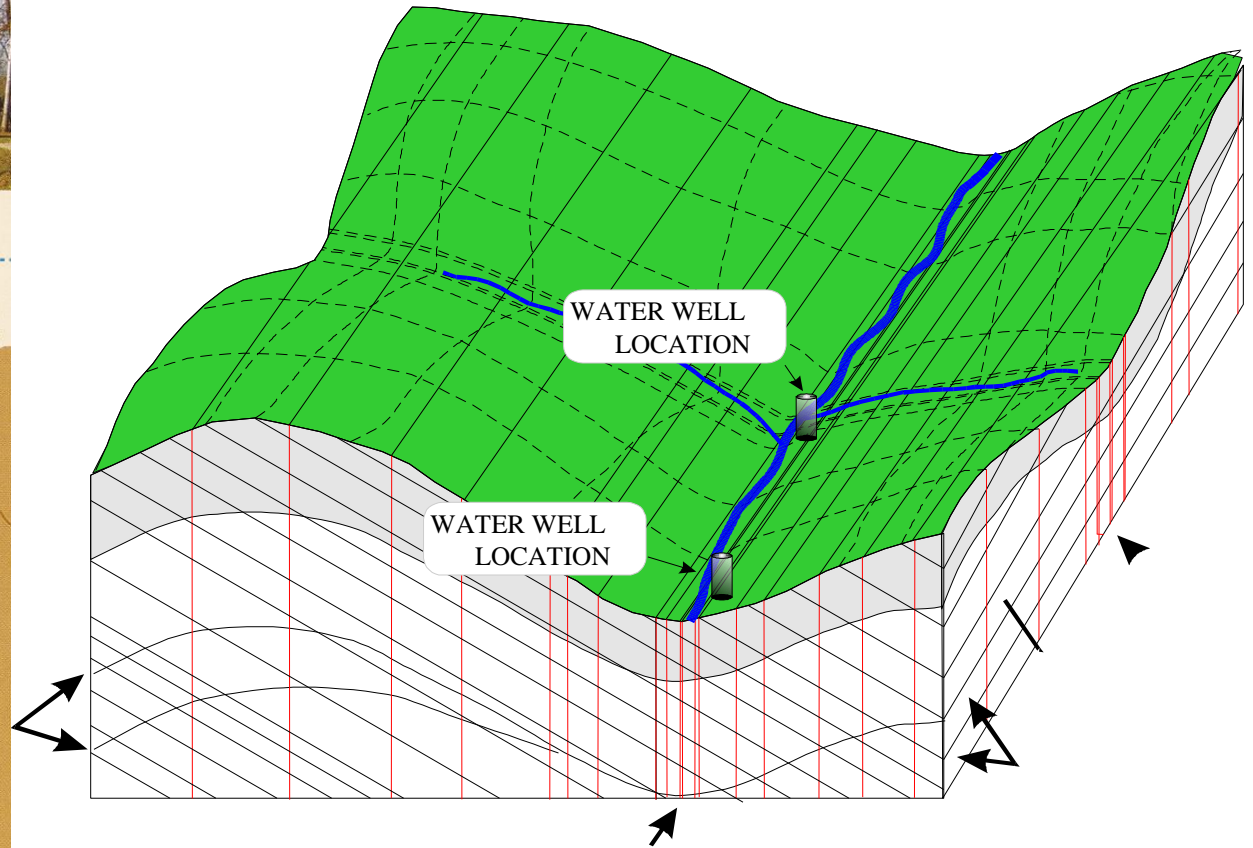
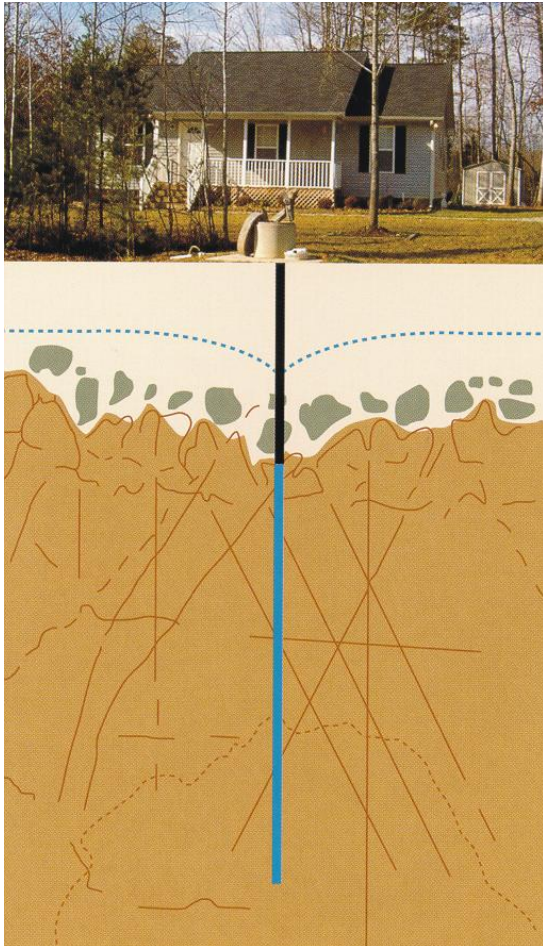
Thick weathered zone provides storage

Discontinuities transmit water from weathered zone into bedrock





Where is it?



Spatial **relation** of all factors



How do I find it?

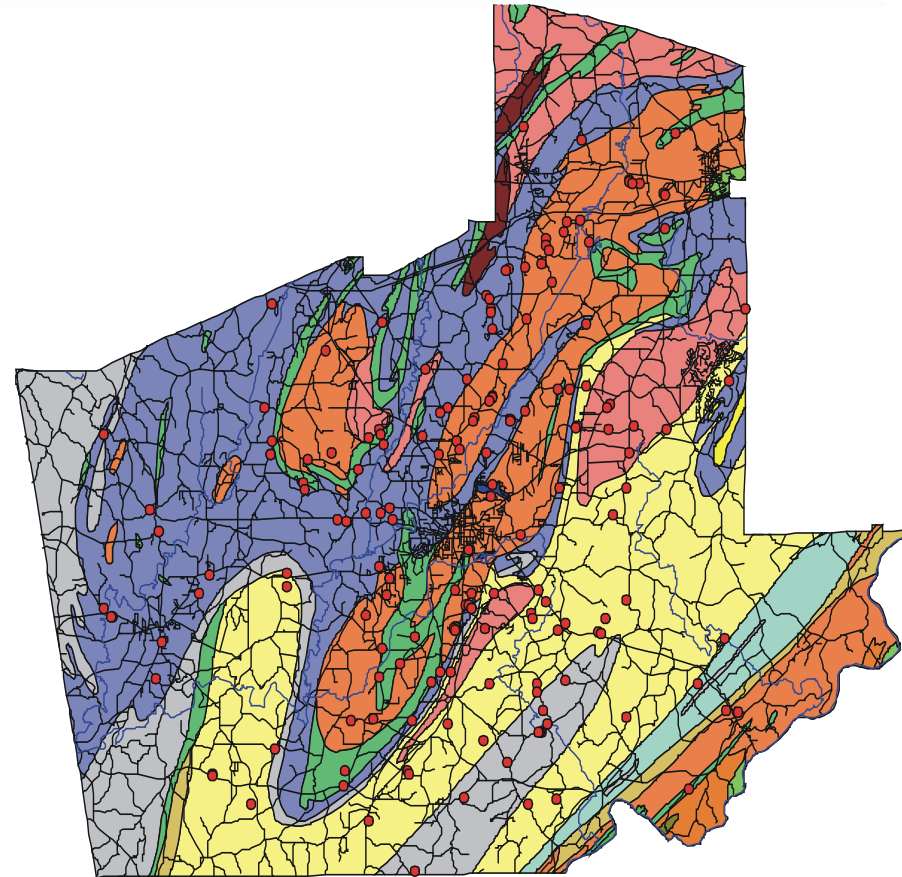
Remember:

- Influencing factors are variable
- Influence is relative, not absolute

Water well data in metamorphic and igneous rocks do not readily lend themselves to *meaningful* statistical analysis

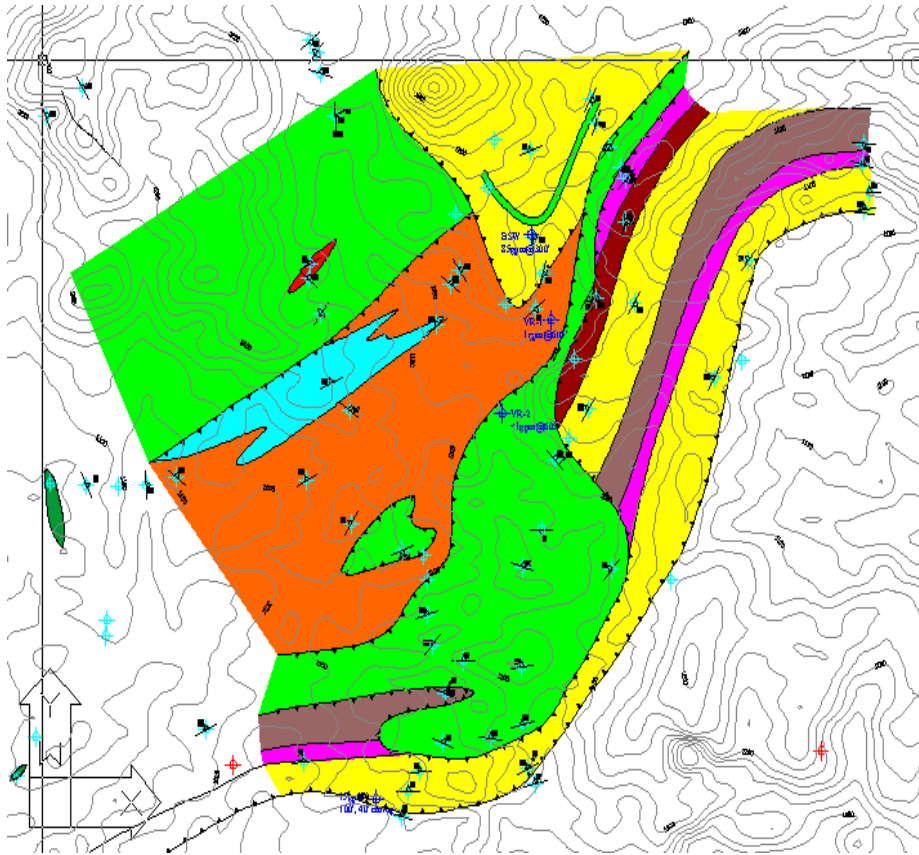
Translation:

Ground water exploration and development in the Piedmont and Blue Ridge requires field investigation and is not done by cookbook methods.





How do I find it?



vs

1-16-98

Authority will turn to 'dowser' to find water

By Herb Denmark
The Times-Georgian

Miller looks to future, reflects on past in his final State of State

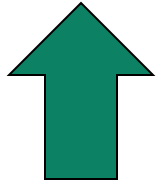
With its board's blessing, the water authority will use a "dowser" to help find a supplemental ground water source.

The Carroll County Water Authority Board Thursday gave Executive Director Jim Baxley the go-ahead to work with Manfred Bauer, a German-born Florida businessman who told Baxley that he is trained in his native country as a "dowser" — a scientist who specializes in

ATLANTA (AP) — In a deep personal speech to the Legislature that drew a sustaining ovation, Gov. Zell Miller looked to the future and reflected on the past Thursday in his final State of the State



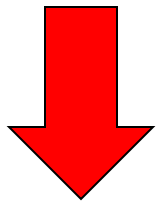
Does it really work?



Bay Springs Middle School (Carroll County)

Well site selected using **detailed geologic mapping** and other criteria

- 1 well drilled
- Total depth 305 ft
- Yield **85 gpm** (122,400 gpd)



City of Villa Rica (Carroll/Douglas Counties)

Well sites selected using **geophysics** and **state geology map** (1:500,000)

- 3 wells drilled
- Total depth 605 ft. each
- Yield < 5 gpm (7,200 gpd) combined



Does it really work?

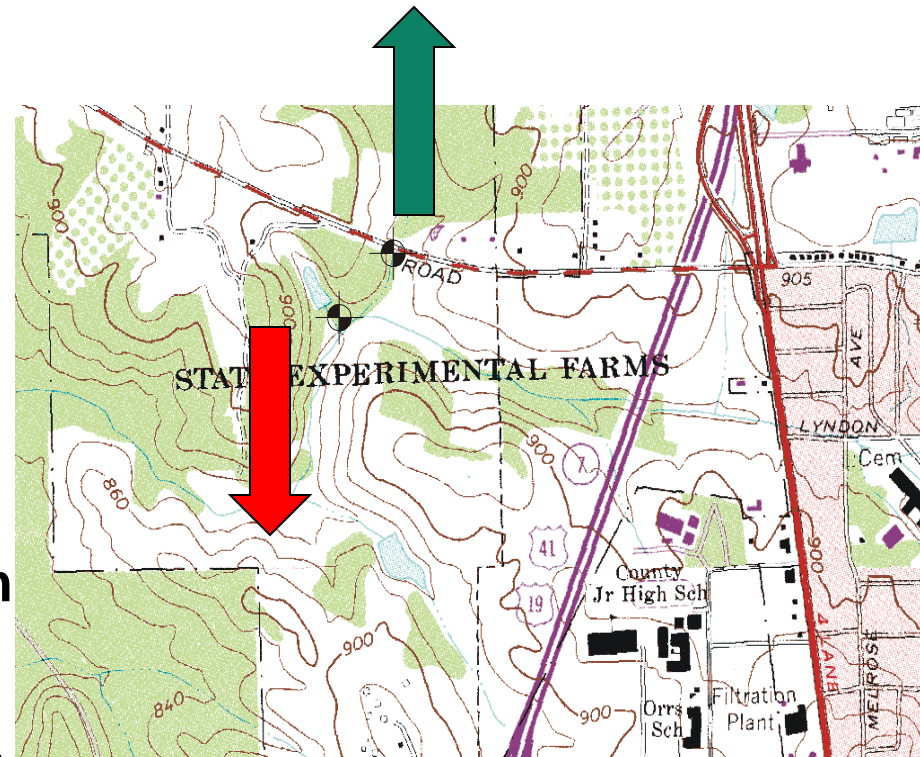
University of Georgia Experiment Station (Spalding County)

Well site selected using **detailed geologic mapping** and other criteria

- 3 sites identified and ranked according to potential yield
- 1 well drilled to 600 ft **150 gpm (216,000 gpd)**

Well site selected using topographic and **aerial photographic lineaments**

- 1 well drilled to 605 ft **10 gpm (1,440 gpd)**





How much is there?

GAEPD *permitted* non-farm withdrawals in Piedmont & Blue Ridge:

- **86 wells** in crystalline rock
 - **53 MGD** total permitted withdrawal
 - 0.6 MGD average
 - 14 wells of 1 MGD or greater
 - Largest permit is 4.8 MGD - Imerys Whitestone (marble)
 - Most permits are for municipal supply
 - Largest municipal permit is 2.8 MGD – Oconee County
-
- Unpermitted use? Thousands of household wells.



How much is there?



Metro North GA Water Planning District

- "...groundwater use makes up less than 1% of the public water supplies... *due to bedrock geology.*" ?8 MGD?
- "Over the 2035 planning horizon, it is expected that the percentage of groundwater use will remain about constant."
- "For planning purposes, groundwater supply sources have been factored into the water supply as a **source for small towns** and as a **supplemental source.**"



How much is there?

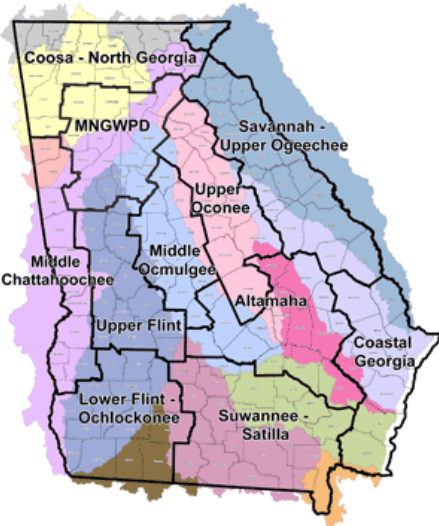
Statewide Water Plan

Review Draft Synopsis Report - Groundwater Availability Assessment.

- “...more groundwater is available from the crystalline rock aquifer than is currently being withdrawn.”
- “It might be difficult to find sufficient water-bearing fractures in the crystalline rock aquifer to develop the full range of sustainable yield, however. Therefore, it is recommended that the lower-end of the sustainable yield range be used for planning purposes.”

But, sample basin water balance for Chattahoochee/Soque:

- “...the net amount of groundwater available is estimated to be 55.6 mgd, which is over 23 times the amount currently being used in the watershed.”

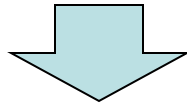




Is ground water a viable supply for north GA?

Metro North GA Water Planning District

- 2006 permitted surface withdrawal = 882 MGD
- 2035 demand
 - 1160 MGD without conservation
 - 1011 MGD with aggressive conservation
- Future water supplies to meet 2035 demand:
 - 165 MGD (48%) maximize existing sources
 - 87 MGD (26%) new reservoirs
 - 89 MGD (26%) conservation
- Ground water not expected to be more than 1% of supply



???We can't find 2 MGD more in the next 25 years???
(total of 10 MGD with existing supply)



Is ground water a viable supply for north GA?

- Theoretical availability of 55.6 MGD calculated in Statewide Water Plan for Habersham County equals the total currently permitted use for the entire Piedmont and Blue Ridge
- Success stories throughout Piedmont and Blue Ridge when appropriate exploration and production methods are applied.
- Tremendous potential for smaller or supplemental needs:
 - Small towns
 - Pump and store for occasional use
 - Distributed non-potable use (e.g. irrigation)
 - Peak demand supplement



Why Do I Care?





Ground water is a viable supply for north GA

We can't afford to overlook an important resource:

- Locally productive
- Some advantages vs surface water:
 - Drought resistant
 - Good quality
 - Low cost
 - Faster permitting
 - Fewer environmental impacts

Since 1985:

- 32 permitted municipal water supply reservoirs = 400+ MGD withdrawal*
- VS
- 53 MGD of permitted ground water withdrawal

* Total permitted surface withdrawal is 3226 MGD, not counting hydroelectric or cooling water



Thank you. Questions?

